

REMARKS

The Office Action mailed September 4, 2008 has been carefully considered by Applicant. Reconsideration is respectfully requested in view of the foregoing amendments to the specification and claims, and the remarks that follow.

Specification

The disclosure is objected to because of language informalities. The disclosure is hereby amended to correct the informalities according to U.S. practice. In addition, the disclosure is amended to include subheadings according to U.S. practice. No new matter is added by this Amendment.

Claim Objections

Claims 1-8 have been objected to because of informalities. By the present Amendment, claims 1-8 are cancelled, thus rendering the claim objections moot.

Drawings

The drawings have been objected to as failing to show in Figures 8 and 9 how the center locks act in a manner to draw the cylindrical components (30) together. The claims and specification are indicated as being unclear as to the disassembly of the locks so that the respective parts of the invention can be placed inside a box as described in the specification.

The objection to the drawings, claims and specification is respectfully traversed. The over-center clamping devices 42 are conventional devices that are commonly known in the industry. The structure and function of these devices would be known by one skilled in the art upon a reading of the application and a viewing of the drawings, as filed. As an example, Applicant submits herewith an internet website advertising suitable fasteners, available from Protex. Amendments to the drawings and specification are not believed necessary, as a skilled person in the art would be well aware of the

working principle of this type of device. Further, the claims are amended herein and now do not recite the clamping device 42.

Withdrawal of the objection to the drawings, specification and claims is therefore respectfully requested.

Claim Rejections Under 35 U.S.C. §112

Claim 5 has been rejected under 35 U.S.C. §112, first paragraph as failing to comply with the enablement requirement. By the present Amendment, claim 5 is cancelled, thus rendering the rejection thereof moot.

Claim Rejections Under 35 U.S.C. §103

Claims 1 and 2 have been rejected as being unpatentable over Campbell U.S. Patent No. 3,940,085 in view of Weaver et al U.S. Patent No. 6,527,220. Claims 3, 4 and 6 have been rejected as being unpatentable over Campbell '085 in view of Weaver et al '220 and further in view of Dobson U.S. Patent No. 819,866. Claim 5 has been rejected as being unpatentable over Campbell '085 in view of Weaver et al '220, further in view of Dobson '866, and further in view of Caregnato U.S. Patent No. 3,494,641. Claim 7 has been rejected as being unpatentable over Campbell '085 in view of Weaver et al '220, further in view of Dobson '866, and further in view of Orzel U.S. Patent No. 6,478,249. Claim 8 has been rejected as being unpatentable over Campbell '085 in view of Weaver et al '220 and further in view of Orzel '249. Claims 1 and 2 have been rejected as being unpatentable over Lefebvre U.S. Patent No. 1,565,655. Claims 3 and 6 have been rejected as being unpatentable over Lefebvre '655 in view of Dobson '866. Claim 4 has been rejected as being unpatentable over Lefebvre '655 in view of Dobson '866 and further in view of Campbell '085. Claim 5 has been rejected as being unpatentable over Lefebvre '655 in view of Dobson '866, and further in view of Caregnato '641. Claim 7 has been rejected as being unpatentable over Lefebvre '655 in view of Dobson '866 and further in view of Orzel '249. Claim 8 has been rejected as being unpatentable over Lefebvre '655 in view of Orzel '249.

By the present Amendment, claims 1-8 are cancelled and replaced with new claims 9-28. Claims 9-28 are believed to distinguish over the applied references, alone or in combination.

Claim 9

Claim 9 recites a modular reel device configured to support a coilable body. The reel device includes a plurality of cylinder segments that are separably connected together in series to form a cylinder. Increasing the number of segments in the series increases the diameter of the cylinder and decreasing the number of cylinder segments in the series decreases the diameter of the cylinder. A pair of opposing end flanges is separably connected to opposite ends of the cylinder. Each end flange includes a flange sector and a flange segment that is separably connected to the flange sector. The pair of opposing end flanges are each configured to separably connect to cylinders having different diameters.

The claimed reel device is not disclosed or rendered obvious by any of the cited references or the remaining prior art.

Campbell '085

Campbell '085 discloses a collapsible reel having opposing flange members 10 connected to opposing hubs 12, which join together to form a cylinder. Campbell '085 does not disclose cylinder segments that are separably connected together in series, *wherein increasing the number of cylinder segments in the series increases the diameter of the cylinder and wherein decreasing the number of cylinder segments in the series decreases the diameter of the cylinder*. Rather, the hubs 12 disclosed in Campbell '085 are semi-circular in cross section and therefore are only configured to join together to form a cylinder of a single diameter. Increasing the number of cylinder segments in the series to increase the diameter of the cylinder is not possible according to the arrangement of Campbell '085. Therefore, Campbell '085 does not disclose the recited plurality of cylinder segments.

In addition, Campbell '085 does not disclose a pair of opposing end flanges *comprising a flange sector and a flange segment that is separably connected to the flange sector*. Rather, the flanges 10 of Campbell '085 are formed from a monolithic structure.

In addition, Campbell '085 fails to disclose opposing end flanges that *are each configured to separably connect to cylinders having different diameters*. Rather, Campbell '085 is only configured to connect to a cylinder 12 having a single diameter.

Weaver et al '220

Weaver et al '220 fails to disclose the claimed *plurality of cylinder segments separably connected together in series to form a cylinder*. Instead, Weaver et al '220 discloses adjustable hubs 15. It follows that Weaver et al '220 also does not disclose an arrangement *wherein increasing the number of cylinder segments in the series increases the diameter of the cylinder and wherein decreasing the number of cylinder segments in the series decreases the diameter of the cylinder*.

Weaver et al '220 also fails to disclose the recited end flanges that include *a flange sector and a flange segment that is separably connected to the flange sector*. Instead, Weaver et al '220 discloses monolithic frame members 12, 14.

In addition, Weaver et al '220 fails to disclose end flanges that are *configured to separably connect to cylinders having different diameters*. The frame members 12, 14 are not configured to connect to cylinders whatsoever.

Dobson '866

Dobson '866 also fails to disclose the *cylinder segments and end flanges per claim 9*.

Caregnato '641

Caregnato '641 relates to a coupling device for pipes, which is largely irrelevant to the claims now pending in the application. Caregnato '641 also fails to disclose the entire *reel device*, per claim 9.

Orzel '249

Orzel '249 also fails to disclose the recited *cylinder segments*. Orzel '249 does disclose a cylinder 40 comprised of wooden planks. However, Orzel '249 does not disclose *wherein increasing the number of cylinder segments in the series increases the diameter of the cylinder and wherein decreasing the number of cylinder segments in the series decreases the diameter of the cylinder*.

In addition, Orzel '249 fails to disclose the recited *end flanges* wherein *each end flange comprising a flange sector and a flange segment that is separably connected to the flange sector*. Instead, Orzel '249 discloses a series of wooden pieces 2A that are fixedly held in formation by a metal strip having a U-shaped cross section and curved into the form of a hoop. The metal strip is welded into a closed formation and therefore there is no separable connection in the cylinder or end flanges, per claim 9.

Lefebvre '655

Lefebvre '655 also fails to disclose the recited *plurality of cylinder segments separably connected together in series to form a cylinder*. Rather, Lefebvre '655 discloses formation of a cylinder 1 by wrapping a single sheet of material (Fig. 1). There is no plurality of cylinder segments. It follows that Lefebvre '655 does not disclose *wherein increasing the number of cylinder segments in the series increases the diameter of the cylinder and wherein decreasing the number of cylinder segments in the series decreases the diameter of cylinder*.

In addition, Lefebvre '655 fails to disclose end flanges comprising *a flange sector and a flange segment that is separably connected to the flange sector*. Rather, Lefebvre '655 discloses monolithic flange structure 3.

Lefebvre '655 also does not disclose a pair of opposing end flanges that are *configured to separably connect to cylinders having different diameters*. Contrary to the Examiner's assertion, Lefebvre '655 specifically discloses engaging tongues 2 in corresponding holes 5 and then bending tongues 2 to engage a struck-out portion 6. Lefebvre '655 does not disclose, as the Examiner indicates, "inserting the tongues 2 through the holes 6 and then passing the tongues through the holes 5 thus reversing the previous process of inserting the tongues." The stated "reversing" process is not present in Lefebvre '655 and the Examiner's interpretation is based upon impermissible hindsight.

Coats U.S. Patent No. 6,352,216 and Bailey et al U.S. Patent No. 5,242,129

Coats '216 and Bailey et al '129 disclose end flanges formed from separable segments. However, these references disclose connection of the end segments to the cylinder and do not disclose *a flange sector and a flange segment that is separably connected to the flange sector*. In Coats '216 and Bailey et al '129, the flange segments are not connected to each other.

Coats '216 and Bailey et al '129 also fail to disclose the recited *plurality of cylinder segments*.

Conclusion

Each of the references fails to disclose several aspects of claim 9. In fact, none of the references discloses the recited *cylinder segments* as defined by claim 9. Further, none of the cited references discloses the recited *end flanges* as defined in claim 9. As such, claim 9 is neither anticipated nor rendered obvious by the cited references alone or in combination. Allowance of claim 9 is therefore respectfully requested.

Claims 10-19

Claims 10-19 depend directly or indirectly from claim 9 and are thus believed allowable for the reasons stated above, as well as the detailed subject matter recited therein.

Claim 20

Claim 20 recites a modular reel device having *a pair of opposing end flanges and a cylindrical center portion extending between the end flanges along a central axis*. As discussed above regarding claim 9, the modular reel device of claim 20 includes end flanges that are composed of *a flange sector and a flange segment that is separably connected to the flange sector*. This aspect is not disclosed by the art. Claim 20 is therefore believed allowable for the reasons stated above.

Claim 20 further recites that the cylindrical's center portion is composed of *a plurality of separable cylinder segments connected to the end flanges*. As discussed above, this aspect is not disclosed by the art. As such, claim 20 is believed allowable.

Claim 20 further recites that the cylinder segments of the central portion *can be connected to the end flanges at more than one radial distance from the central axis of the reel*. This aspect is also not disclosed in the art and therefore claim 20 is believed allowable.

Claims 21-28

Claims 21-28 depend directly or indirectly from claim 20 and therefore are believed allowable for the reasons stated above, as well as the detailed subject matter recited therein.

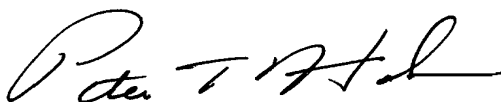
Application No. 10/595,342
Amendment Dated December 3, 2008
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Conclusion

The present application is thus believed in condition for allowance. Such action is respectfully requested.

Respectfully submitted,

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Amended Specification - Marked-Up Copy
Application No. 10/595,342
Inventorship: Terje H. Houen
Attorney Docket No. 1935-00233

A METHOD AND DEVICE FOR REEL TRANSPORT

FIELD

This invention regards a method of reel transport. More particularly it regards a method of transporting an empty
5 reel of the type equipped with outer peripheral tracks and which is typically used for transport and storage of relatively heavy coiled bodies. The invention also regards a device for implementation of the method.

BACKGROUND

10 When shipping long, coilable bodies such as pipes, so-called umbilicals or coiled tubing used in petroleum production, it is common for the long body to be coiled on a drum of considerable size. The package weight may be in the hundreds of tons, with a reel diameter of the order of 10 meters and a
15 reel width in excess of 5 ~~metres~~meters.

In the following, the long, coilable body is denoted a "pipe".

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Transporting pipes on reels of this kind of size and weight is a relatively costly operation, not only because the reel and pipe together represent a substantial weight but also because the geometry of the reel makes it difficult to stow, lift and secure the package efficiently. Thus the reel must be placed in a cradle or similar to hold it safely in place during transport. In some cases transport across relatively long distances requires the use of a special vessel.

It has turned out that the cost of shipping an empty reel of this type can approach that associated with shipping the reel.

SUMMARY

The object of the invention is to remedy the disadvantages of prior art.

The object is achieved in accordance with the invention, by the characteristics stated in the description below and in the following claims.

By constructing the reel so that it may be split into suitable sections for storage and transport in a packed-up form, preferably in standard shipping containers, the costs associated with the storage and transport of empty reels may be reduced significantly.

Reducing the volume of ordinary empty reels is known *per se*.
Thus US patent no. 5 242 129 describes a cable drum
comprising a cylindrical portion and end flanges, where the
end flanges are removably attached to the cylindrical
5 portion.

US patents 5 649 677 and 5 588 628 regard cable drums
equipped with two disc-like end flanges, where the end
flanges are interconnected by articulated stays. In the
unfolded position the stays form the mid section of the
10 reel, and the stays are arranged to be folded up to bring
the end flanges closer together when the reel is empty.

Prior art deals with dismountable and collapsible cable
drums of a size that allows them to be transported on an
ordinary lorry.

15 Even when scaled up, dismountable or collapsible cable drums
according to prior art are not suited for use in the size
range described in this invention.

Reels for the object of this invention will during winding
and unwinding be placed in a cradle, which is equipped with
20 running wheels and generally also driving wheels. The wheels
of the cradle rotate about axes that are parallel to the
axis of rotation of the reel, the end flanges of the reel
each being equipped with a peripheral rolling surface
abutting the wheels of the cradle. The rigidity and strength
25 of the reel must be sufficient to accommodate the torque
that would arise if the driving wheel of one half of the
cradle were to stop while the driving wheel of the other

half of the cradle rotates. These torsional forces may become quite substantial with full loading on the drum.

The smallest reel diameter may be in the order of 5 ~~metres~~meters. Obviously it is an advantage if the
5 cylindrical central section of the reel can also be split into smaller sections.

In a preferred embodiment the cylindrical central section is divided into segments of a cylinder interconnected in a separable manner, the end portions of which are removably
10 attached to the end flanges.

Preferably the end flanges are constructed in a way that allows the cylinder segments to be disposed at more than one distance from the central axis of the reel. In this manner it becomes possible, by arranging a sufficient number of
15 cylinder segments at the outer attachment points of the end flanges, to transport pipes with a relatively large minimum bend radius, e.g. 3.5 ~~metres~~meters.

BRIEF DESCRIPTION OF THE DRAWINGS

The following describes a non-limiting example of a
20 preferred embodiment illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of a reel mounted on the wheels of a cradle;

Figure 2 shows the reel of figure 1, but here the cylinder segments of the reel are arranged at a greater distance from the ~~center~~center of the reel;

Figure 3 is a perspective view of a triangular flange
5 portion and a segment of a flange, which together form a flange sector of the end flange of the reel;

Figure 4 is a perspective view of a cylinder segment;

Figure 5 is a plan view of two cylinder segments bolted together;

10 Figure 6 shows the screw-bolt-joint of figure 5 on a larger scale;

Figure 7 shows an alternative screw-bolt-joint seen from the inward facing side of the cylinder segments;

Figure 8 is a perspective view of two cylinder segments
15 fitted with over ~~center~~center locks;

Figure 9 shows the over ~~center~~center lock in figure 8 on a larger scale; and

Figure 10 shows parts of a reel placed in a standard 40-foot open container.

DETAILED DESCRIPTION OF THE DRAWINGS

In the drawings, reference number 1 denotes a reel comprising two disc-like end flanges 2, 2' and a cylindrical central portion 4 extending between the end flanges 2, see
5 figure 1.

The disc-like end flanges 2, 2' are provided with encircling peripheral rolling surfaces 6 arranged to rotate on the wheels 8 of a cradle (not shown). Each end flange 2, 2' is provided with a plurality of inner notches 10 distributed
10 along a pitch circle about the central axis of the reel 1, and a plurality of outer notches 12, the notches 12 being distributed along a pitch circle having a greater radius than that of the pitch circle for the inner notches 10.

The end flanges 2, 2' are composed of a plurality of
15 triangular flange portions 14 and flange segments 16, see figure 3, where one triangular flange portion 14 and one flange segment 16 are bolted together by means of splices 18 to form an end flange sector 20. Four end flange sectors 20 bolted together form an end flange 2, 2'. Each end flange 2,
20 2' has a central through opening 22 fitted with driving lugs 24. The driving lugs 24 are arranged to take up the torque from a central driving mechanism (not shown).

The cylindrical central portion 4 is constituted by a plurality of cylinder segments 30 interconnected by means of
25 dovetail connections 32. The ends of the cylinder segments 30 are equipped with a plurality of fastening hooks 34, see figure 4, that match the notches 10, 12 in the end flanges

2, 2'. A latch pin 36 is arranged to slide into a bore (not shown) in the end flanges 2, 2' to prevent the fastening hooks 34 from falling out of the notches 10, 12.

By placing the fastening hooks 34 of the cylinder segments 30 in the inner notches 10, see figure 1, the reel 1 can be prepared for receipt of as long a piping length as possible, while the reel 1 is adapted to pipes having a greater minimum bend radius by placing the fastening hooks 34 in the outer notches 12, see figure 2.

10 In an alternative embodiment the cylinder segments 30 are fastened together by means of screw-bolt-joints 38, see figures 5 and 6.

In a further embodiment, see figure 7, the cylinder segments 30 are clamped together by means of an eye bolt connection 40.

An over ~~center~~center clamping device 42 for holding the cylinder segments 30 together is shown in figures 8 and 9, where the cylinder segments 30 are equipped with guide pegs 44 and corresponding peg holes (not shown).

20 The sections 14, 16 and 30, which form part of the reel 1, may advantageously be constructed so as to fit into a standard shipping container.

Figure 10 shows a plurality of flange segments 16 and a plurality of cylinder segments stowed into a 40-foot shipping container 46.